

## CIVIL AERONAUTICS BOARD

## ACCIDENT INVESTIGATION REPORT

Adopted: January 18, 1951

Released: January 18, 1951

## NORTHWEST AIRLINES, INC.—BENTON HARBOR, MICH., JUNE 23, 1950

## The Accident

At approximately 2325, June 23, 1950, a C-54A-DC, N-95425, owned and operated by Northwest Airlines, crashed into Lake Michigan approximately 18 miles north-northwest of Benton Harbor, Mich. None of the 55 passengers and three crew members survived. The aircraft was destroyed.

## History of the Flight

The flight 2501, was scheduled to operate between the terminal points of New York, N Y, and Seattle, Wash, via intermediate points of Minneapolis, Minn, and Spokane, Wash. At approximately 1931 the flight departed from LaGuardia Airport for Minneapolis with a crew consisting of Robert C Lind, captain, Verne F Wolfe, first officer, and Bonnie A Feldman, stewardess. On board were 55 passengers, 2,500 gallons of fuel, 80 gallons of oil, and 490 pounds of express, which resulted in an aircraft weight of 71,342 pounds for takeoff. This was 58 pounds below the maximum permissible takeoff weight, and the load was distributed so that the center of gravity was within approved limits. The flight plan filed with ARTC (Air Route Traffic Control) specified a cruising altitude of 6,000 feet to Minneapolis. An altitude of 4,000 feet had been originally requested because of forecast en route thunderstorms, but denied by ARTC because other traffic was assigned at that level.

At 2149, when over Cleveland, Ohio, a cruising altitude of 4,000 feet was again requested by the flight and this time approved by ARTC. Forty minutes later the flight was requested by ARTC to descend to 3,500 feet because there was an eastbound flight at 5,000 feet over Lake Michigan which was experiencing severe turbulence and difficulty

in maintaining its assigned altitude. ARTC estimated that the two flights would pass each other in the vicinity of Battle Creek, Mich, and that the standard separation of 1,000 feet would not be sufficient because of the turbulence. At 2251, Flight 2501 reported that it was over Battle Creek at 3,500 feet, and that it would be over Milwaukee at 2337. When in the vicinity of Benton Harbor, at 2313, the flight requested a cruising altitude of 2,500 feet, however, no reason was given for the request. ARTC was unable to approve this altitude because of other traffic. Acknowledgment that ARTC could not approve descent to 2,500 feet was received at 2315, and this was the last communication received from the flight.

At 2337, Northwest Radio at Milwaukee advised the company at LaGuardia and Minneapolis, and ARTC at Chicago, that the flight was ten minutes overdue since they had incorrectly copied the 2251 flight report as 2327. At 2345 Northwest Radio at Milwaukee transmitted to the flight instructions to circle the range station at Madison, Wis, if its radio transmitter was inoperative. During the same period, all CAA (Civil Aeronautics Administration) radio stations in the Chicago-Minneapolis area tried to contact the flight on all frequencies. At 2358, Chicago ARTC, at the request of Northwest Airlines, alerted air-sea rescue facilities in the area, which included the Air Force, Navy, Coast Guard, and the state police of Illinois, Michigan, Wisconsin, and Indiana. The missing aircraft was assumed to have been involved in an accident at 0530 since the fuel supply at that time would have been exhausted.

## Investigation

An intensive search of the Lake Michigan area was commenced at daylight June 24. On the following day, at 1830, the United States

\* All times referred to herein are Central Standard and based on the 24-hour clock.

Coast Guard cutter Woodbine found an oil slick, aircraft debris, and the aircraft log book in Lake Michigan approximately 18 miles north-northwest of Benton Harbor

At 0530, June 25, underwater search operations were conducted with divers and sonar equipment. Divers descended at the points where strong sonar contacts were made. At those locations, the lake bottom was 150 feet below the surface of the water and was covered by a layer of silt and mud estimated to be 30 to 40 feet deep. Visibility was less than eight inches. The possibility of locating anything was slight, and movement was severely restricted. In addition to diving operations, the entire area was dragged with grapnel but without results.

After two days of operation, the Navy suspended their search because of the difficult conditions, and because nothing had been found which would indicate that the aircraft could be recovered. Since then, the Coast Guard and aircraft flying in that area have maintained a sea and air surveillance.

The only parts of the aircraft that were recovered were those with sufficient buoyancy to float: a fuel tank float, foam rubber cushions, arm rests, clothing, blankets, pillows, pieces of luggage, cabin lining, plywood flooring and other wooden parts. The cushions and arm rests, shredded from impact forces and cutting edges of the fuselage, indicated that the aircraft struck the water at high speed. A plywood oxygen bottle support bracket, which had been installed in the forward left side of the fuselage, showed that the inertia forces acted in a forward, downward, and to the left direction. There was no sign of fire found on any parts recovered.

An examination of all maintenance records of N-95475 disclosed no irregularities. The last crew to fly the aircraft had reported it "mechanically okay" for turn-around. The aircraft had been given a preflight check prior to takeoff and was airworthy in all respects.

None of the radio communications received from the flight, including the last, contained any mention of trouble. Although shortly before the accident the flight requested an altitude of 2,500 feet, there was no indication that the flight was experiencing difficulty at the 3,500-foot altitude. No reason for the request for the lower altitude was given nor was an emergency declared.

Captain Lind and First Officer Wolfe arrived at the Northwest Flight Control Office at LaGuardia Field at approximately 1800, one hour before the scheduled departure of Flight 2501. At that time the crew and the dispatcher discussed the weather situation, and examined the hourly sequence reports relating to en route and terminal weather. Company forecasts, Weather Bureau forecasts, and Weather Bureau maps were available and were examined by the crew. Company and Weather Bureau forecasts indicated thunderstorms in the Detroit-Minneapolis area with moderate to severe turbulence above 10,000 feet, and light to moderate turbulence below 10,000 feet. For this reason Captain Lind and the dispatcher decided on a cruising altitude of 4,000 feet, but as previously mentioned, ARTC was unable to approve that altitude and assigned a cruising altitude of 6,000 feet. In addition to the above, and of particular interest to the flight, was a special thunderstorm forecast issued by the company at 1545 which read as follows:

"Scattered thunderstorms along and east of the cold front, bases at 3,000 to 4,000 feet, tops 30,000 to 40,000 feet with moderate to severe turbulence at all levels in the thunderstorm and moderate turbulence below thunderstorms, advising flights below 10,000 feet to proceed with caution in the frontal zone, anticipating the activity to be at its peak between the hours of 2230 of the 23rd and 0400 of the 24th EST with possible squall line development ahead of the front during the evening."

At 1845 a new forecast was issued by the company, but was received by the New York dispatcher after the crew had left Flight Control. Since this forecast called for better weather than the earlier one, the crew was not advised. At 2133 the Weather Bureau issued a regional forecast for the period 2200 of June 23rd to 1000 of June 24th, which predicted widespread thunderstorm activity and a squall line extending from southern Wisconsin eastward into lower Michigan and moving southward. The southern edge of the squall line was located west of Benton Harbor at the approximate time of this accident.

The forecast containing information on the squall line was placed on the teletype one

hour and 40 minutes before the accident, and the Flight Advisory Weather Service made it available to ARTC. However, regional forecasts are not routinely broadcast. In this case the Flight Advisory Weather Service man on duty did not request ARTC to warn flights of the squall line, nor did ARTC do so on their own initiative. The company meteorologist questioned the existence of a squall line at that time, and consequently no advice concerning it was furnished the flight by the company.

Several flights flew over the southern Lake Michigan area for a period of one hour after and one hour before the accident occurred. The pilots stated that they encountered moderate to severe turbulence, frequent cloud-to-cloud and cloud-to-ground lightning, but no hail. Several flights successfully circumnavigated the storm by flying to the south. Three that took off from Detroit after midnight of June 24th returned because of turbulence encountered at the edge of the storm. One pilot who returned to Detroit stated that he was unable to fly over the storm because it extended over 30,000 feet.

Analysis of both the official meteorological data and testimony of witnesses indicates that the squall line was quite severe and that its southern edge was located at or near the location of the accident at time of accident.

#### Analysis

Impact damage found in fragments of the aircraft that were recovered showed that the airplane struck the water with considerable force. It was not possible to determine from these few fragments whether there had been any failure prior to the time of impact.

From the evidence available, there are no definite conclusions to be drawn. A possibility that this accident resulted from some mechanical failure seems to be remote, for no indication of trouble was contained in any of the communications received from the flight. Furthermore, the aircraft maintenance records, the flight report from the last crew who had flown the aircraft, and the inspection which was accomplished just prior to takeoff, all are to the effect that this airplane was in an airworthy condition.

It is known that the flight entered an area where there was severe turbulence and

that it crashed shortly afterward. This fact in itself indicates that the accident probably resulted from either a structural failure caused by the turbulence, or because control of the airplane was lost. However, there is no evidence upon which a determination can be made as to which of these two possibilities actually caused the accident. Accordingly, it must be concluded that there is not sufficient evidence from which the probable cause of this accident can be determined.

#### Findings

On the basis of all available evidence the Board finds that

- 1 The carrier, crew and aircraft were properly certificated.
- 2 Prior to takeoff, the crew was thoroughly briefed regarding the en route and terminal weather, which included a forecast of thunderstorm activity and the possible development of a squall line.
- 3 A forecast was issued one hour and 40 minutes prior to the accident, and while the flight was en route, in which was described the development and location of a squall line. This forecast was not made available to the flight.
- 4 No report of difficulty in the operation of the aircraft or any of its components was received from the flight.
- 5 At 2313 the flight requested a lower altitude but because of conflicting traffic, the request was denied.
- 6 At the approximate time of the accident a squall line was located in the area where the aircraft crashed.
- 7 Despite an intensive surface and underwater search, the aircraft was not located with the exception of a few fragments.

#### Probable Cause

The Board determines that there is not sufficient evidence upon which to make a determination of probable cause.

BY THE CIVIL AERONAUTICS BOARD

/s/ D W RENTZEL  
/s/ JOSH LEE  
/s/ HAROLD A JONES

Oswald Ryan, Vice Chairman, did not participate in the adoption of this report.

# Supplemental Data

## Investigation and Hearing

Notification of this accident was received by the Civil Aeronautics Board from the CAA Communications Station at Chicago. An investigation was immediately initiated in accordance with the provisions of Section 702 (a)(2) of the Civil Aeronautics Act of 1938, as amended. As part of the investigation a public hearing was held July 13 and 14, 1950, at Chicago, Ill.

## Air Carrier

Northwest Airlines, Inc., is a Minnesota corporation having its principal place of business at 1885 University Avenue, St. Paul, Minn. The company is engaged in the transportation by air of persons, property and mail, and holds a certificate of public convenience and necessity issued by the Civil Aeronautics Board which authorizes it, among other things, to operate between New York, N. Y., and Seattle, Wash., via various other intermediate points. The carrier also holds an air carrier operating certificate issued by the Administrator of Civil Aeronautics.

## Flight Personnel

Robert C. Lind, the captain, age 35, was employed by Northwest Airlines May 8, 1941. He was checked out on a DC-4 type aircraft June 23, 1946, and qualified over the Milwaukee-New York segment on April 28, 1945. He maintained his qualification in DC-4's and had flown over the route continuously since the above dates. During the 90 days prior to the accident, he had flown 105 hours in DC-4 type aircraft and had flown 15 round trips over the Minneapolis-New York and Minneapolis-Washington routes.

He was the holder of a current airline transport pilot certificate No. 63357 with single and multi-engine land ratings, 0 to 7200 horsepower. He had logged a total of 8,662 flight hours, of which 1,968 were accumulated in DC-4 type aircraft. Captain Lind's total instrument time was 914 hours. During the month of June 1950 he had accumulated 58 hours. Prior to departure of Flight 2501 from LaGuardia, he had a total rest period of 24 hours. He had completed a first class CAA physical February 13, 1950, and

had satisfactorily completed a six-month instrument flight check on February 10, 1950. He also satisfactorily completed an annual line flight check on March 28, 1950.

Verne F. Wolfe, copilot, age 35, was employed by Northwest Airlines May 21, 1943. He was checked out in DC-4 type aircraft as of August 8, 1946, and maintained his qualification continuously since that date. During the 90 days prior to the accident, he had flown 82 hours in DC-4 type aircraft and had flown 13 round trips over the Minneapolis-New York and Minneapolis-Washington routes.

Copilot Wolfe held a valid airline certificate No. 152763 with commercial single, multi-engine land and instrument ratings. He had logged a total flying time of 3,821 hours, of which 470 hours were accumulated in DC-4 type aircraft. His total instrument flying time was 400 hours. Prior to departure from LaGuardia, he had a rest period of 24 hours. Copilot Wolfe completed a first class CAA physical January 19, 1950.

## Aircraft

N-95425, a C-54A-DC, currently certificated by the Administrator of Civil Aeronautics, was owned and operated by Northwest Airlines. It was manufactured September 5, 1943, and originally operated by the United States Air Forces and later by Linea Aeropostal Venezolana. It was purchased by Northwest Airlines April 11, 1947, and entered scheduled Northwest Airlines' service on June 25, 1947. On April 25, 1950, it was converted to a 55-passenger cargo-coach aircraft. At the time of the accident it had a total of 15,902 flight hours and 1,692 flight hours since the last major overhaul. The engines, four Pratt & Whitney Model 2SD13-G, 1450 horsepower, had been flown one through four, respectively 8,040 hours, 6,829 hours, 8,935 hours, 11,129 hours, and all engines had accumulated 623 hours since the last overhaul. The aircraft was equipped with four Hamilton Standard propellers Model 23E50, and the total time on the propellers, one through four, respectively, was 4,677, 4,677, 9,854, 9,854, and each propeller had accumulated 623 hours since overhaul.